

## Non-Hazardous Solid Waste Diversion Rate Measure of Merit

***“By the end of FY2005, ensure the diversion rate for non-hazardous solid waste is greater than 40%, while ensuring integrated non-hazardous solid waste management programs provide an economic benefit when compared with disposal using landfilling and incineration alone.”***

Under this MoM, components shall report their 1.) diversion rate, and, 2.) cost avoidance (or additional costs) resulting from the use of integrated solid waste management, and, optionally, may report the amount of solid waste disposed through waste-to-energy incineration. Components shall report annually on a fiscal year basis, using the following units, as appropriate: percentage, tons (2,000 pounds per ton), and dollars. In preparing reports, components need not include data from installations generating less than one ton of solid waste per day. The methods for calculating the data are explained in detail below:

### Diversion Rate Calculation

The diversion rate equals the rate at which non-hazardous solid waste is diverted from entering a disposal facility. Disposal facilities include landfills (both solid waste and inert) and incinerators. Composting, mulching, recycling, reuse, and donation are generally accepted waste diversion methods. The diversion rate equals:

$$(R/(R+L))*100 = \text{diversion rate (per cent)}$$

R = amount (in tons) of non-hazardous solid waste (including construction and demolition debris) that is composted, mulched, recycled, reused, donated, or otherwise diverted from a disposal facility.

L = amount (in tons) of solid waste (including construction and demolition debris) transferred to a disposal facility.

For example, if an installation composts 750 tons, recycles 1,500 tons, landfills 3,750 tons, and incinerates 1,000 tons in a waste-to-energy program from its total of 7,000 tons of solid waste generated, it would report as follows:

$$R = 750 \text{ tons} + 1,500 \text{ tons} = 2,250 \text{ tons}$$

$$L = 3,750 \text{ tons} + 1,000 \text{ tons} = 4,750 \text{ tons}$$

$$(R/(R+L))*100 = (2250/(2250+4750))*100 = 32.1\% = \text{diversion rate (higher is better)}^1$$

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<sup>1</sup> Note that although the diversion rate is the MoM, each level (installation, major command, and service) will be required to report the diversion rate itself, along with R, L, and R+L, in order to permit roll-up of the data.

## Waste-to-Energy Incineration (Optional)

Components may also report the amount of solid waste disposed through waste-to-energy incineration. (Whether waste-to-energy incineration provides an environmental benefit when compared to ordinary incineration, or to landfilling, is debatable. Components that believe their waste-to-energy incineration projects do result in an environmental benefit may report the percentage so disposed.)

Continuing the above example, 7,000 tons of solid waste were generated, with 1,000 tons going to a waste-to-energy incinerator.  $R+L$  = Total amount generated.  $I$  = Total amount disposed by waste-to-energy incineration.

$$R+L = 7,000 \text{ tons}$$

$$I = 1,000 \text{ tons}$$

$$I/R+L = 14.3\%^2$$

## Economic Benefit of Integrated Solid Waste Management Calculation

In achieving the 40 percent diversion rate, components should ensure that the cost of integrated non-hazardous solid waste management is less than the potential cost of disposing of all solid waste by traditional means, such as landfilling and incineration. The following calculation compares the costs for a hypothetical installation that generates a total of 10,300 tons of solid waste, including 1,350 tons of construction demolition debris<sup>3</sup>:

$PDC - ADC$  = cost avoidance due to integrated solid waste management (dollars)

$PDC$  = potential disposal cost if all waste were to be landfilled or incinerated (in dollars).<sup>4</sup>

$ADC$  = actual cost of integrated solid waste management (in dollars).

For example, if an installation:

- Spent \$300K operating a QRP
- Received \$330K in proceeds from the sale of 1500 tons of recyclables through its QRP
- Spent \$75K operating a composting program
- Received \$80K in proceeds from composting 750 tons

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<sup>2</sup> Note that if the rate of waste-to-energy incineration is reported, each level (installation, major command, and service) must also report  $R$ ,  $L$ , and  $R+L$ , in order to permit roll-up of the data.

<sup>3</sup> For this example the installation pays \$38 per ton for solid waste that it disposes of in the local municipal landfill. The installation operates its own on-base inert landfill. The estimated direct costs of disposing inert material in the on-base landfill is \$5 per ton.

<sup>4</sup> Actual cost per ton of disposal (tipping fee or incineration fee) multiplied by total tons generated during the year.

- Paid a contractor an extra \$10K to pick up and recycle 300 tons of glass, which the QRP found uneconomic to recycle.
- Donated 50 tons of construction demolition debris to a local community (in return for hauling)
- Recycled 300 tons of construction demolition debris for on-base use at a cost of \$4K
- Disposed of 1000 tons of construction demolition debris in an on-base inert landfill at an estimated cost of \$5 per ton
- Disposed of 6,400 tons of solid waste in a municipal landfill at \$38 per ton

it would report as follows:

$$\text{PDC} = (8950 \text{ tons} * \$38 \text{ per ton}) + (1350 \text{ tons} * \$5 \text{ per ton}) = \$346,950$$

$$\text{ADC} = \$300,000^5 - \$330,000^6 + \$75,000^7 - \$80,000^8 + \$10,000^9 + \$4,000^{10} + (1000 \text{ tons} * \$5)^{11} + (6,400 \text{ tons} * \$38 \text{ per ton})^{12} = \$238,200$$

$\$346,950 - \$227,200 = \$119,750$  (cost avoidance resulting from integrated solid waste management)

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<sup>5</sup> Cost of operating QRP

<sup>6</sup> Proceeds from sales by QRP

<sup>7</sup> Cost of operating composting program

<sup>8</sup> Proceeds from sales by composting program

<sup>9</sup> Cost to pickup and recycle glass (note that this is less than the cost of disposing of the glass by landfilling)

<sup>10</sup> Cost to reuse construction and demolition debris on base

<sup>11</sup> Estimated cost (hauling, covering, and other direct costs) for disposing of 1,000 tons of construction and demolition debris in an on-base inert landfill at the hypothetical installation. Each installation that operates an on-base landfill will have to calculate its own actual costs per ton.

<sup>12</sup> Cost of disposing of 6,400 tons of solid waste in the local municipal solid waste landfill at \$38 per ton